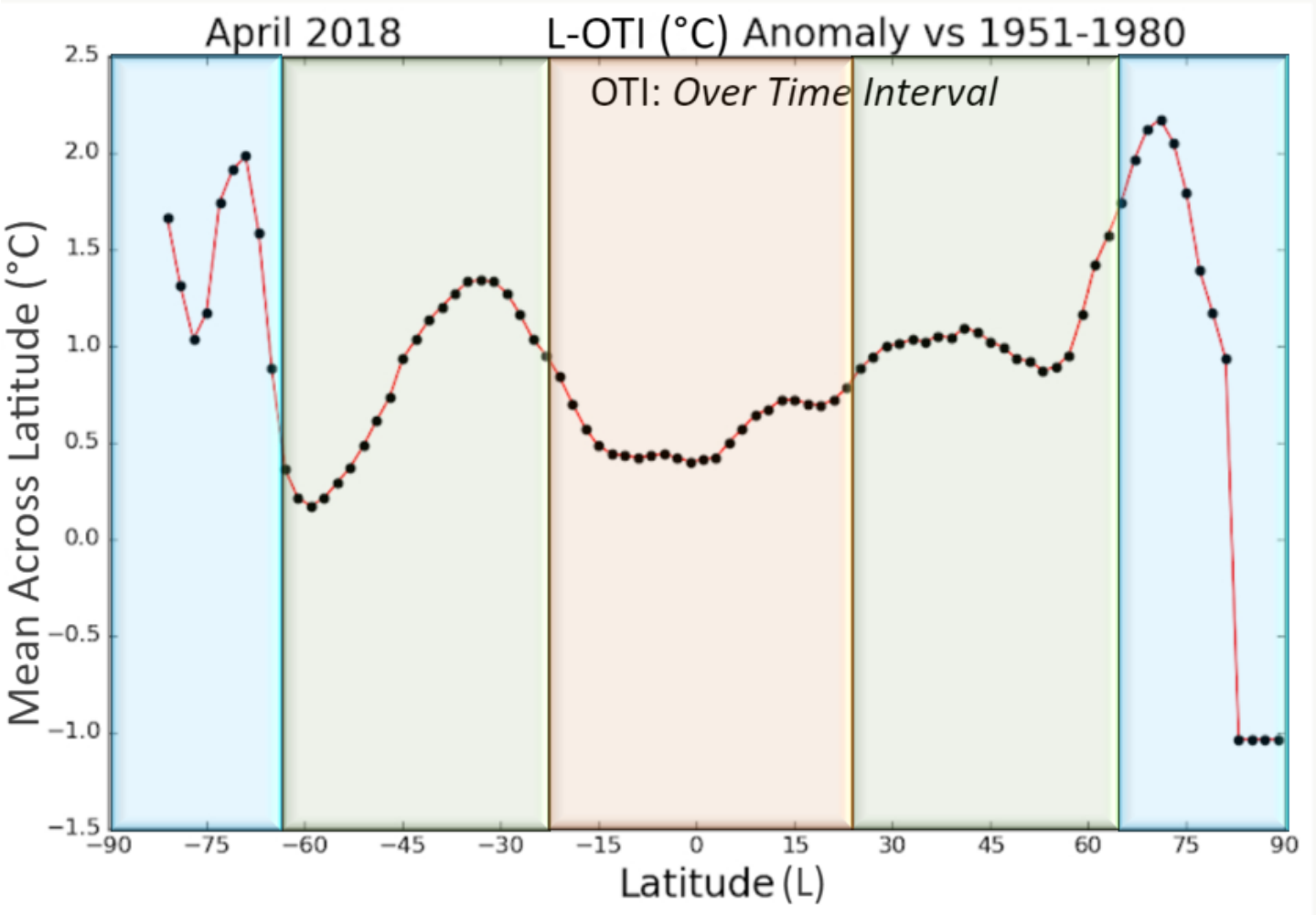
My NASA Data - Mini Lesson

Surface Air Temperature Graph by Latitude



Mini Lesson

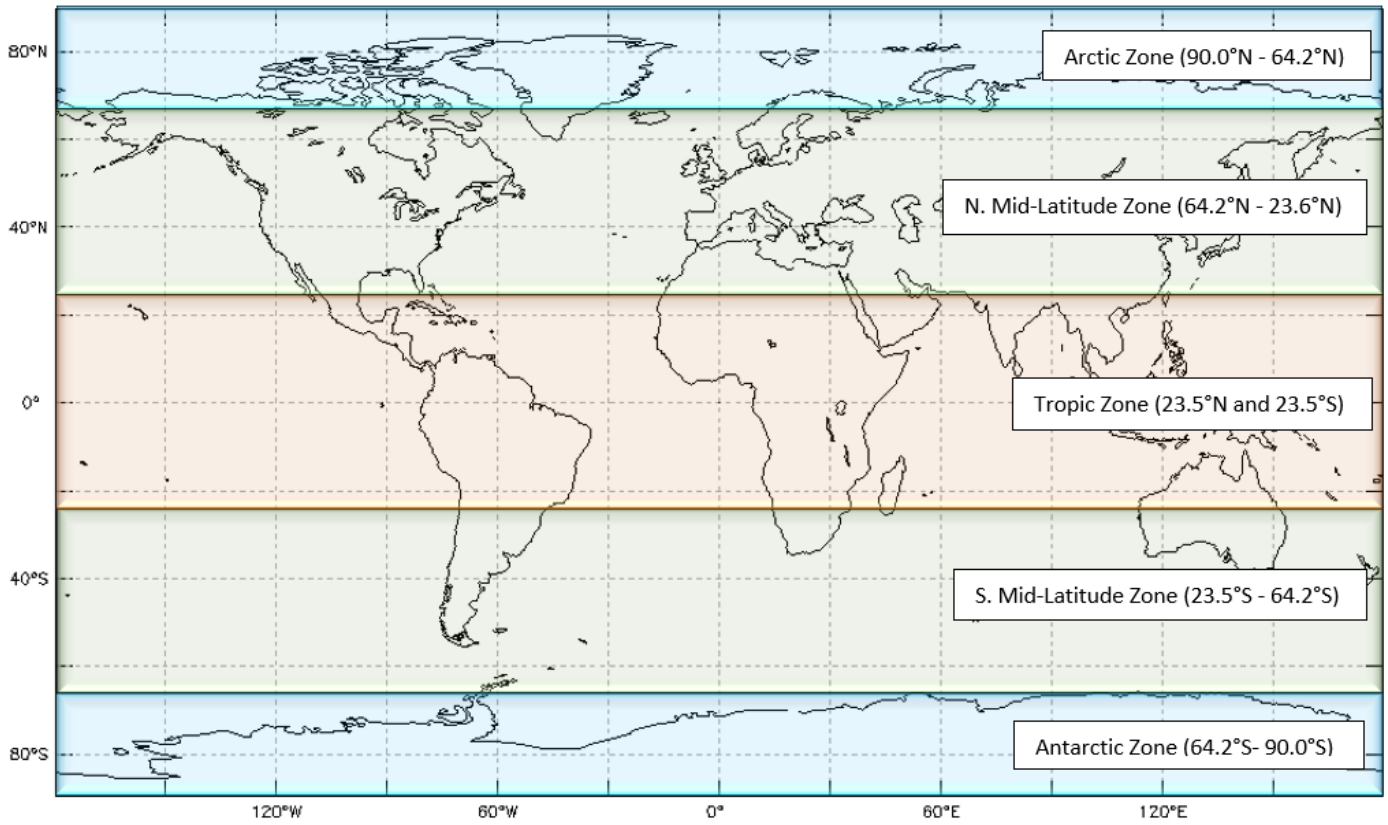
The **surface air temperature** is how hot air is near the surface of the Earth, measured at 2 meters above the ground or ocean surface. Surface air temperature is the same as the temperature that is included in the daily weather report. Scientists measure surface air temperature at more than ten thousand locations throughout the world.

In the visualization below of global surface air temperature anomalies from 1880 to 2017, we can observe changes in surface air temperature across the Earth's surface. These changes are taking place across different latitudes.

We know that lines of **latitude** are the angular measurements of north-south location on Earth and that these horizontal lines range from 90° South (at the South pole), 0° (all along the equator), to 90° North (at the North pole).

The map below shows groups of latitudes, which are referred to as **zones**; they include:

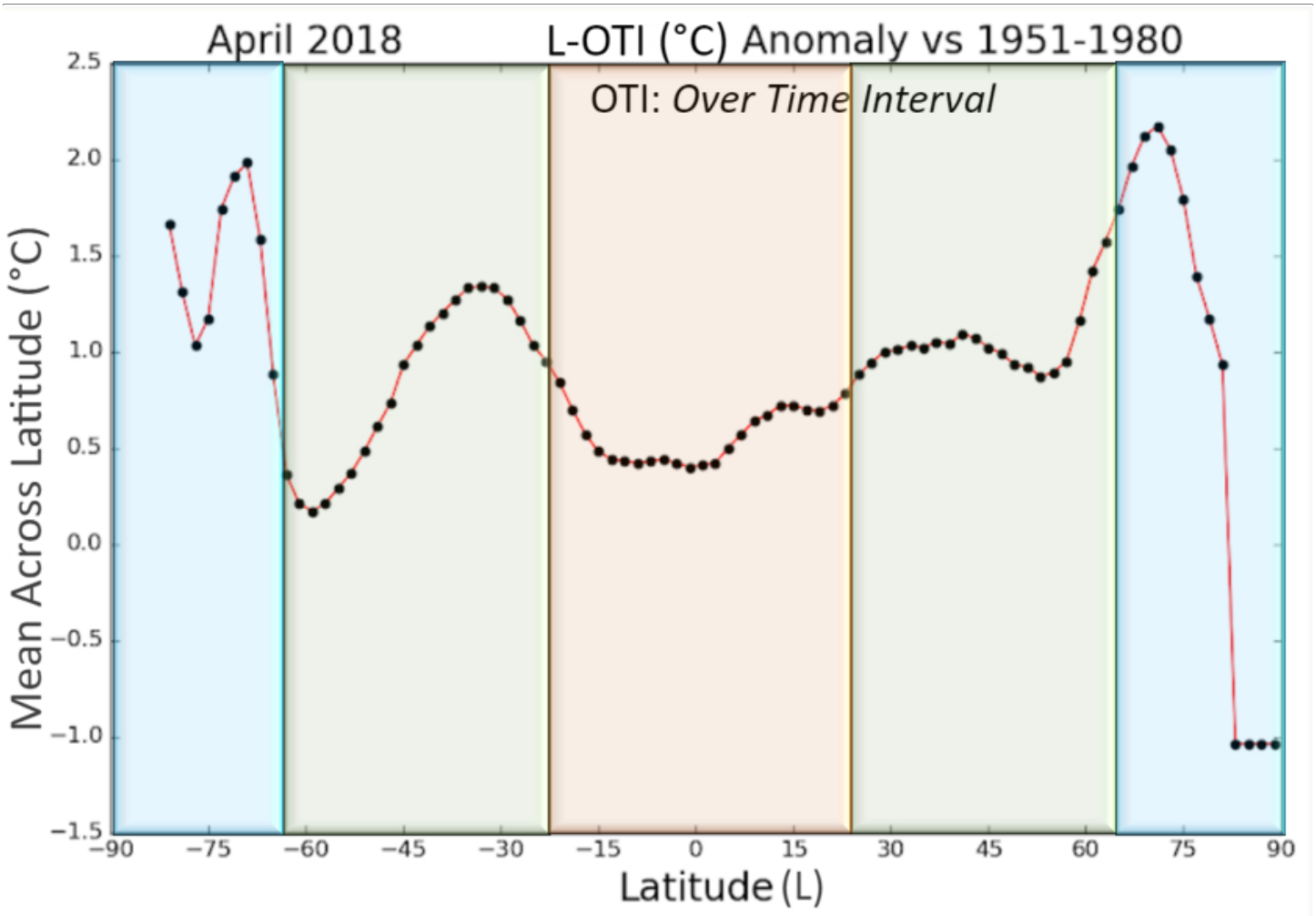
- **The Arctic Zone** (90.0°N - 64.2°N)
- **The N. Mid-Latitude Zone** (64.2°N - 23.5°N)
- **The Tropic Zone** (between 23.5°N and 23.5°S)
- **The S. Mid-Latitude Zone** (23.5°S - 64.2°S)
- **The Antarctic Zone** (64.2°S - 90.0°S)



The zones of latitude can also be identified within the graph of surface air temperature data below. (Note: latitudes of the Southern Hemisphere are displayed as negative values (-) on the x-axis, while latitudes of the Northern Hemisphere are displayed as positive values (+).)

Let’s take a look and analyze the line plot!

Latitude Surface Temperature Anomalies for April 2018



Notice how the global temperature data are reported in the above graph as anomalies?

An **anomaly** in this case will refer to any instance when the mean temperature (°C) across a latitude was either higher (+) or lower (-) than normal (0.0). In the graph above, surface air temperature data from April of 2018 is being compared against data from a base period in the past when far more typical surface air temperatures were recorded on Earth (e.g., 1951-1980).

Additionally, scientists are always looking for patterns in data. Any recognizable pattern of change (e.g., increase, decrease, stability, variability, or cyclical nature) that can be identified in the data is referred to as a **trend**.

Putting it all together: Now, let's take what we know about zones of latitude, as well as anomalies and trends, to answer some questions about this line plot of global surface air temperatures:

1. At what latitudes and within which zone(s) do you see the most significant surface air temperature *positive* anomalies? What do these positive anomalies indicate?
2. At what latitudes and within which zone(s) do you see the most significant surface air temperature *negative* anomalies? What does these negative anomalies indicate?
3. What trends in surface air temperature do you observe with respect to latitude? (Do you see places in the graph where a pattern can be recognized?)
4. What inference(s) or conclusion(s) can you make about these data? Can you provide any scientific explanation(s) for these?
5. What can you NOT infer or deduce from these data? What other data would you like to view in order to gain an even clearer understanding?

Teachers who are interested in receiving the answer key, please contact MND from your school email address at larc-mynasadata@mail.nasa.gov.

Earth System Data Explorer

- Get the Zonal Mean Data here.
- GISS Surface Temperature Analysis